

**PRELIMINARY
STORM WATER MANAGEMENT PLAN
FOR
QUEEN OF ANGELS CHURCH
ALPINE, CALIFORNIA**

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Grading, BMP and Preliminary Erosion Control Maps

INTRODUCTION

The Storm Water Management Plan (SWMP) is required under the County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance (Section 67.817). The purpose of this SWMP is to address the water quality impacts of the proposed improvement on the site. Best Management Practices (BMPs) will be utilized to provide a long-term solution to water quality. This SWMP is also intended to ensure the effectiveness of the BMPs through proper maintenance that is based on long-term fiscal planning. The SWMP is subject to revisions as needed by the engineer.

CERTIFICATION PAGE

This Storm Water Management Plan has been prepared under the direction of the following Registered Civil Engineer. The Registered Civil Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Daniel A. Lee
Registered Civil Engineer

Date

SECTION 1 DESCRIPTION OF PROPOSED PROJECT

1.1 PROJECT LOCATION

The Queen of Angels site is located in the unincorporated area of Alpine, in the County of San Diego, approximately 2.0 miles north of the intersection of Highway 8 and Victoria Drive. The site fronts West Victoria Drive to the west and north and Hale Drive to the east. (See Vicinity Map.) Currently, the approximately 8.5-acre site is an undeveloped lot, with the exception of an existing church on the southwest corner of the property. The project site is located within the El Capitan Hydrologic Area. The tributary basins will feed into an existing earthen channel along the southern end of the property.

1.2 PROJECT DESCRIPTION

Existing Condition

Currently the undeveloped lot allows storm runoff to sheet flow across the property, which is then captured in earthen drainage swales running north to south. Storm runoff from half of Victoria Drive is also conveyed through the property and is eventually captured in the earthen swales. Under the existing condition, 10% of the project site (approximately 1.1 Acres) is impervious. The topography of the site and surrounding adjacent lots slopes in a north to south direction. Within the site, there is a difference in elevation of approximately 70-feet between the north and south boundaries. There is a ridge that runs in a north to south direction located approximately through the middle of the project site with canyons on both sides that run in a similar direction as the ridge.

Physical Features

The project proposes to expand on an existing church site by constructing a new church facility with additional hall/office buildings, parking, and landscaping, which will change the impervious area to approximately 4.5 acres. The proposed expansion creates 114 additional parking spaces. The development of the site will require the construction of drainage facilities to convey storm runoff into the existing earthen channel located within the southerly portion of the site.

Land Use

The property is zoned A70, Limited Agricultural Use Regulation, and is within the San Diego County General Plan Designation of (1) Residential. Under the Zoning Ordinance the land will be used as Religious Assembly. The surrounding land uses of the project site are residential with 1+ acre lots on the south and west sides with 1+ to 2+ acre lots on the north and east sides.

1.3 HYDROLOGIC UNIT CONTRIBUTION

The Queen of Angeles project is located within the Alpine Hydrologic Subarea (907.33) within the El Capitan Hydrologic Area (907.30) in the San Diego Hydrologic Unit (907). The project drains southerly towards Alpine Creek. The storm drain system for this project will discharge to the existing natural channels, which are approximately 0.6 mile upstream from Alpine Creek. These channels will receive offsite storm water runoff in addition to the project site. The proposed runoff velocities will be reduced to existing runoff velocities. Overall, the project area represents 0.2% of the Alpine Hydrologic Subarea.

The water stored within the watershed is used to serve a portion of the San Diego metropolitan area and the communities of El Cajon, Santee, Lakeside, Alpine, and Julian. The annual precipitation ranges from less than 11 inches at the coast to about 35 inches around Cuyamaca and El Capitan Reservoir.

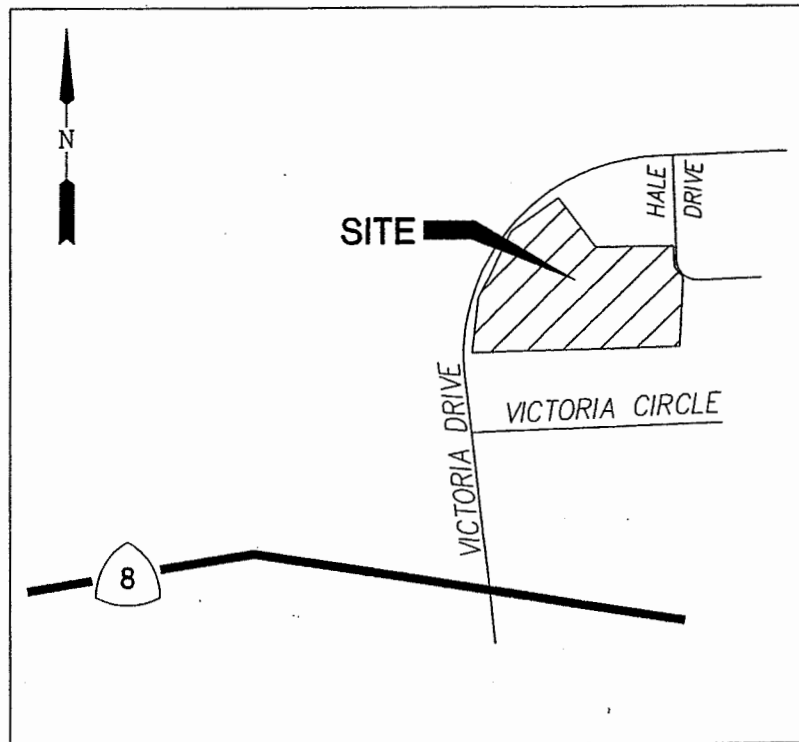
1.4 RESPONSIBLE PARTIES

Owner: Roman Catholic Bishop of San Diego
P.O. Box 85728
San Diego, CA 92186
(619) 224-8298

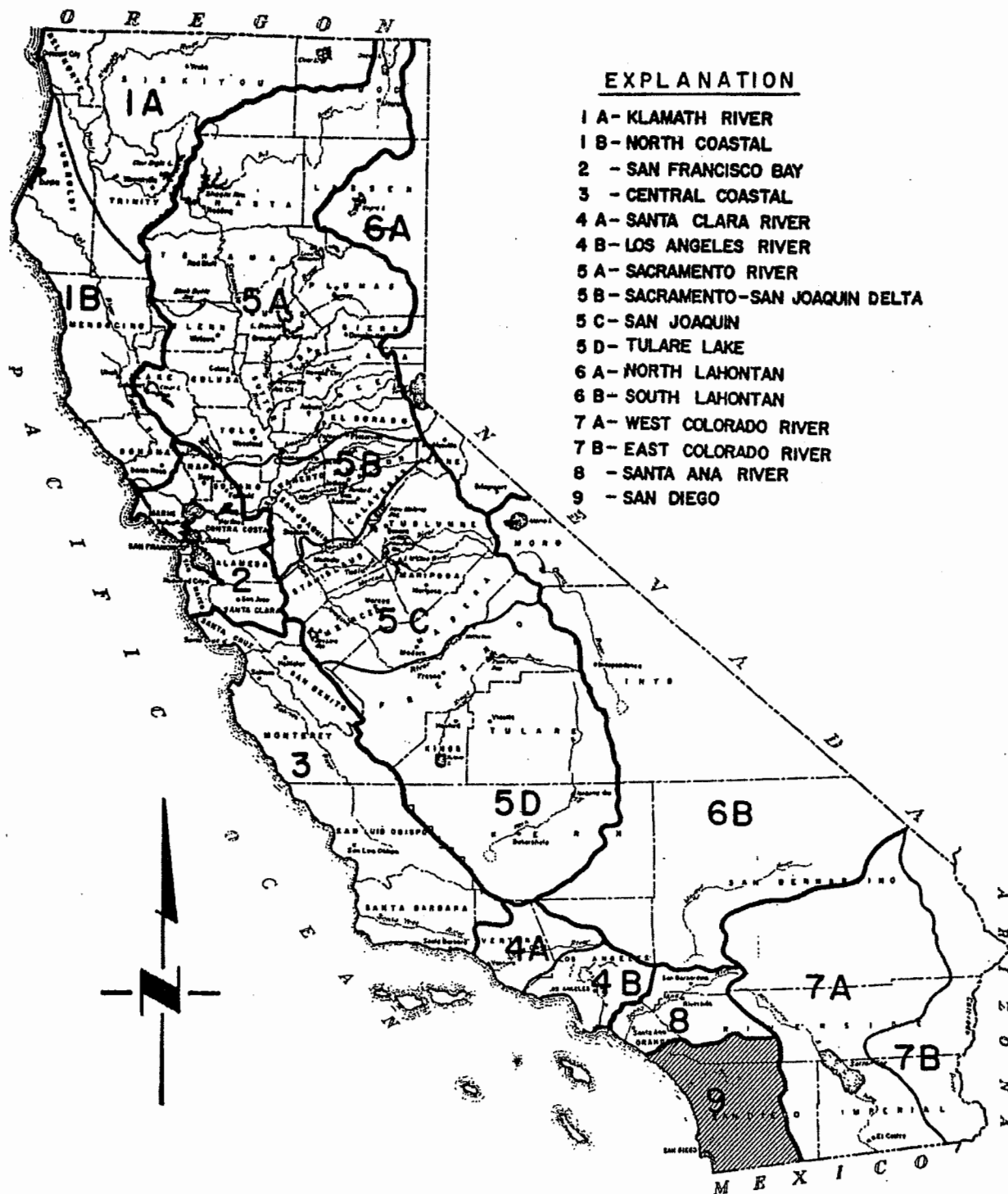
Developer: Jerry Price & Sons
P.O. Box 895
Alpine, CA 91903
(619) 445-2141

Responsible Person: Michael A. Wunderlin
(760) 743-2238

The owner will be responsible for implementation and maintenance of all storm water management practices. The owner shall maintain and inspect the storm water treatment units and the fossil filters a minimum of twice a year, before and after the rainy season, after large storms, or more frequently if needed. Proper proof of maintenance will be reported to the appropriate agency. Further maintenance activities for structural BMPs will be discussed in Section 5 of this report.



VICINITY MAP
NO SCALE

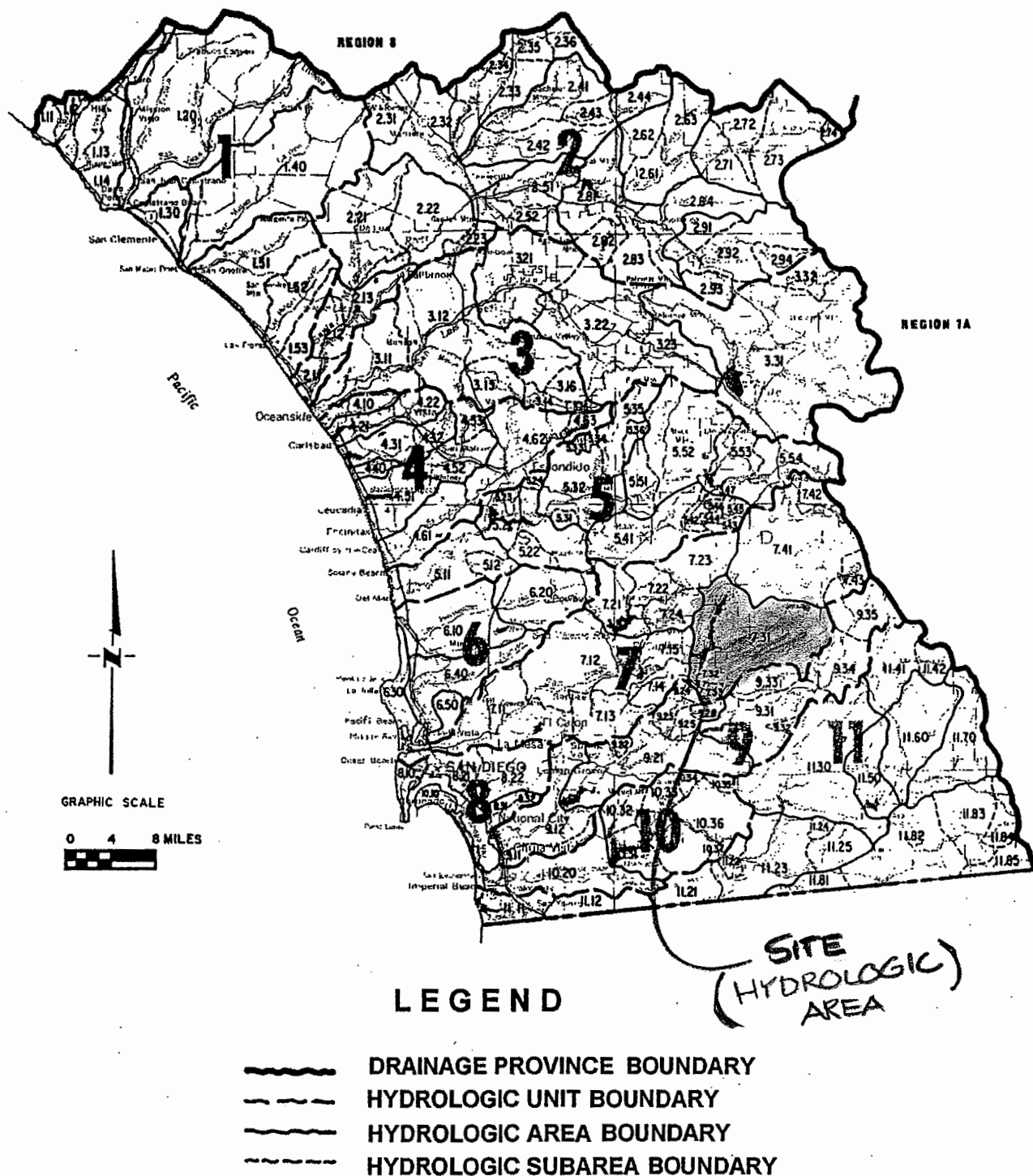


VICINITY MAP, BASIN PLANNING AREAS

Figure 1 - 1.

**TABLE 1 - 2. HYDROLOGIC UNITS, AREAS (HA) AND SUBAREAS (HSA)
OF THE SAN DIEGO REGION**

BASIN NUMBER	HYDROLOGIC BASIN	BASIN NUMBER	HYDROLOGIC BASIN
5.30	San Pasqual HA	9.00	SWEETWATER HYDROLOGIC UNIT
5.31	Highland HSA	9.10	Lower Sweetwater HA
5.32	Las Lomas Muertas HSA	9.11	Telegraph HSA
5.33	Reed HSA	9.12	La Nacion HSA
5.34	Hidden HSA	9.20	Middle Sweetwater HA
5.35	Guejito HSA	9.21	Jamacha HSA
5.36	Vineyard HSA	9.22	Hillsdale HSA
5.40	Santa Maria Valley HA	9.23	Dehesa HSA
5.41	Ramona HSA	9.24	Galloway HSA
5.42	Lower Hatfield HSA	9.25	Sequan HSA
5.43	Wash Hollow HSA	9.26	Alpine Heights HSA
5.44	Upper Hatfield HSA	9.30	Upper Sweetwater HA
5.45	Ballena HSA	9.31	Loveland HSA
5.46	East Santa Teresa HSA	9.32	Japatul HSA
5.47	West Santa Teresa HSA	9.33	Viejas HSA
5.50	Santa Ysabel HA	9.34	Descanso HSA
5.51	Boden HSA	9.35	Garnet HSA
5.52	Pamo HSA		
5.53	Sutherland HSA	10.00	OTAY HYDROLOGIC UNIT
5.54	Witch Creek HSA	10.10	Coronado HA
6.00	PENASQUITOS HYDROLOGIC UNIT	10.20	Otay Valley HA
6.10	Miramar Reservoir HA	10.30	Dulzura HA
6.20	Poway HA	10.31	Savage HSA
6.30	Scripps HA	10.32	Proctor HSA
6.40	Miramar HA	10.33	Jamul HSA
6.50	Tecolote HA	10.34	Lee HSA
7.00	SAN DIEGO HYDROLOGIC UNIT	10.35	Lyon HSA
7.10	Lower San Diego HA	10.36	Hollenbeck HSA
7.11	Mission San Diego HSA	10.37	Engineer Springs HSA
7.12	Santee HSA	11.00	TIJUANA HYDROLOGIC UNIT
7.13	El Cajon HSA	11.10	Tijuana Valley HA
7.14	Coches HSA	11.11	San Ysidro HSA
7.15	El Monte HSA	11.12	Water Tanks HSA
7.20	San Vicente HA	11.20	Potrero HA
7.21	Fernbrook HSA	11.21	Marron HSA
7.22	Kimball HSA	11.22	Bee Canyon HSA
7.23	Gower HSA	11.23	Barrett HSA
7.24	Barona HSA	11.24	Round Potrero HSA
7.30	El Capitan HA	11.25	Long Potrero HSA
7.31	Conejos Creek HSA	11.30	Barrett Lake HA
7.32	Glen Oaks HSA	11.40	Monument HA
7.33	Alpine HSA	11.41	Pine HSA
7.40	Boulder Creek HA	11.42	Mount Laguna HSA
7.41	Inaja HSA	11.50	Morena HA
7.42	Spencer HSA	11.60	Cottonwood HA
7.43	Cuyamaca HSA	11.70	Cameron HA
8.00	PUEBLO SAN DIEGO HYDROLOGIC UNIT	11.80	Campo HA
8.10	Point Loma HA	11.81	Tecate HSA
8.20	San Diego Mesa HA	11.82	Canyon City HSA
8.21	Lindbergh HSA	11.83	Clover Flat HSA
8.22	Chollas HSA	11.84	Hill HSA
8.30	National City HA	11.85	Hipass HSA
8.31	El Toyon HSA		
8.32	Paradise HSA		



**FIGURE 1-2. SAN DIEGO REGION HYDROLOGIC UNITS
AREAS, AND SUBAREAS**

SECTION 3 WATER QUALITY ENVIRONMENT

3.1 BENEFICIAL USES

Under the Clean Water Act, "the beneficial use designation of surface waters of the state must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation." The beneficial uses for the hydrologic unit are included in Tables 3-1 through 3-3. These tables have been extracted from the Water Quality Control Plan for the San Diego Basin.

Inland Surface Waters

Inland surface waters from Alpine Creek and Chocolate Canyon have the following beneficial uses as shown in Table 3-1.

Table 3-1. Beneficial Uses for Inland Surface Waters

Hydrologic Unit Number	MUN	AGR	IND	PROC	REC1	REC2	WARM	COLD	WILD
907.33	X	X	X	X	X	X	X	X	X
907.31	X	X	X	X	X	X	X	X	X

X Existing Beneficial Use.

O Potential Beneficial Use.

Groundwater

Groundwater beneficial uses for the El Capitan Hydrologic Area include agricultural and municipal.

Table 3-2. Beneficial Uses for Groundwater

Hydrologic Unit Number	MUN	AGR
907.30	X	X

X Existing Beneficial Use.

O Potential Beneficial Use.

Reservoir

El Capitan Reservoir beneficial uses are shown in Table 3-3.

Table 3-3. Beneficial Uses for Reservoir Water

Hydrologic Unit Number	MUN	AGR	IND	PROC	REC1	REC2	WARM	COLD	WILD	RARE
907.31	X	X	X	X	X*	X	X	X	X	X

X Existing Beneficial Use.

O Potential Beneficial Use.

* Fishing from shore or boat permitted, but other uses are prohibited.

Per the Water Quality Control Plan for the San Diego Basin (9), the beneficial uses for Alpine Creek, El Capitan Hydrologic Area, and Reservoir water are defined as:

- *Municipal & Domestic Supply (MUN)*: Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- *Agricultural Supply (AGR)*: Includes uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
- *Industrial Service Supply (IND)*: Includes uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.
- *Industrial Process Supply (PROC)*: Includes uses of water for industrial activities that depend primarily on water quality.
- *Contact Water Recreation (REC-1)*: Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, whitewater activities, fishing, or use of natural hot springs.
- *Noncontact Water Recreation (REC-2)*: Includes the uses of water for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

- *Warm Freshwater Habitat (WARM)*: Includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- *Wildlife Habitat (WILD)*: Includes uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, and invertebrates), or wildlife water and food sources.
- *Cold Freshwater Habitat (COLD)*: Includes uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- *Threatened or Endangered Species (RARE)*: Includes uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.

3.2 303(d) STATUS

According to the 1998 California 303(d) list published by the San Diego Regional Water Quality Control Board, there are no impaired water bodies that are associated with the project.

The project location and watersheds have been compared to the current published 303(d) list of impaired water bodies, and the nearest impaired water body is the Pacific Ocean at the San Diego River, which is impaired by a high coliform count. The Pacific Ocean is approximately 30 miles away from the project.

SECTION 4 CHARACTERIZATION OF PROJECT RUNOFF

4.1 STORM WATER QUALITY AT OUTFALL(S)

The California Water Codes define “water quality objectives” as: “The limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area”.

The project will protect beneficial uses of water as required by the California Water Code and the Clean Water Act. The project will include treatment facilities to prevent nuisances from the developed site from entering the existing earthen channel.

4.2 EXISTING AND POSTCONSTRUCTION DRAINAGE

The proposed conditions will convey onsite and offsite flow through curb and gutter systems, which is captured in catch basins located throughout the site. Pipes will convey the runoff into the existing earthen swale located along the southern end of the site.

The proposed project will not significantly alter drainage patterns on the site. The storm water discharge points will not divert runoff significantly from existing conditions. Because the project proposes to increase the hardscape area by constructing additional parking spaces and drive aisles, an additional 40% of the site will be impervious. This change in land use will increase the composite runoff coefficient of the project from $C = 0.47$ to $C = 0.69$. Also, additional surface oils left by motor vehicles will be introduced to surface runoff. Although the oils maybe minimal, it is an increase in the pollutants introduced to storm waters.

There will not be a substantial increase in the peak flow rate; it will increase from 45 CFS under the existing condition to 46 CFS under the proposed condition. See Table 4-1 for a summary of flows.

Table 4-1. Postconstruction Water Quality Flows

Outfall	Tributary Area (Acres)	Q_{100} (CFS)	Q_{WQ} (CFS)
A	9.0	32	5.3
B	6.4	15	2.4

A detailed description of the drainage patterns and flows are discussed in the Drainage Report submitted to the County of San Diego, updated in September 2002. The above section is an excerpt from that report.

As discussed before, the existing condition is undeveloped, with the exception of an existing church. Postconstruction runoff will be directed into storm drain systems. These systems will not divert water from its natural outlet points. The preliminary design of these systems is included in the BMP map.

The flows were developed using the 6-hour and 24-hour isopluvial maps developed by the County of San Diego Department of Sanitation and Flood Control for the 100-year event.

Water Quality Treatment Volume

The water quality treatment volume is based on the water quality design storm of the 85th percentile precipitation map developed by the County of San Diego. The proposed treatment facilities will be designed to carry the calculated design volumes. (See attached Calculations, next page.) Summaries of the postconstruction water quality flows are also included in Table 3-1.

4.3 POSTCONSTRUCTION EXPECTED DISCHARGES

There are no sampling data available for the existing site condition. In addition, the project is not expected to generate significant amounts of nonvisible pollutants. However, the following constituents are commonly found on similar developments and could affect water quality:

- Sediment discharge due to construction activities and Postconstruction areas left bare.
- Nutrients from fertilizers.
- Trash and debris deposited in drain inlets.
- Hydrocarbons from paved areas.
- Pesticides from landscaping and home use.

4.4 SOIL CHARACTERISTICS

The total project area is assumed to consist of Soil Group D, to be conservative. The project will not have slopes steeper than 2:1. All slopes will include slope protection for construction and Postconstruction.

Note: Information regarding soils conditions is available in the Soil Survey, San Diego Area, California, U.S. Department of Agriculture, 1973.

By CL Date 6/02 Client

Sheet No. 1 Of 1

Checked

Date

Job

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WATER QUALITY DESIGN STORM

PER COUNTY 85TH PERCENTILE SOPLUVIAL, DESIGN INTENSITY $I = 0.85$ in/hr

① PER HYDROLOGY STUDY

$$AREA = 9.0 \text{ AC}$$

$$C = 0.7$$

$$Q = CIA = (0.7)(0.85)(9.0) = 5.36 \text{ CFS}$$

$$Q_A = 5.4 \text{ CFS}$$

② PER HYDROLOGY STUDY

$$AREA = 3.2 \text{ AC}$$

$$C = 0.6$$

$$Q = CIA = (0.6)(0.85)(3.2) = 1.63$$

$$Q = 2.4 \text{ CFS}$$

SECTION 5

MITIGATION MEASURES TO PROTECT WATER QUALITY

To address water quality for the project, BMPs will be implemented during construction and postconstruction.

5.1 CONSTRUCTION BMPs

A detailed description of the construction BMPs will be developed during the Grading Plan and Improvement Plan Engineering. Since the project is in the preliminary development phase only, a listing of potential types of temporary BMPs is available. This includes the following:

- | | |
|--|---|
| ▪ Silt Fence | ▪ Desilting Basin |
| ▪ Fiber Rolls | ▪ Gravel Bag Berm |
| ▪ Street Sweeping and Vacuuming | ▪ Sandbag Barrier |
| ▪ Storm Drain Inlet Protection | ▪ Material Delivery and Storage |
| ▪ Stockpile Management | ▪ Spill Prevention and Control |
| ▪ Solid Waste Management | ▪ Concrete Waste Management |
| ▪ Stabilized Construction Entrance/Exit | ▪ Water Conservation Practices |
| ▪ Dewatering Operations | ▪ Paving and Grading Operations |
| ▪ Vehicle and Equipment Maintenance | ▪ Permanent Revegetation of All Disturbed Uncovered Areas |
| ▪ Erosion Control Mats and Spray-On Applications | |

Construction BMPs for this project will be selected, constructed, and maintained so as to comply with all applicable ordinances and guidance documents.

5.2 POSTCONSTRUCTION BMPs

Pollutants of concern as noted in Section 4 will be addressed through three types of BMPs. These types of BMPs are site design, source control, and treatment control.

Site Design BMPs

The project is designed to minimize the use of impervious areas. An additional 30% of the project area will be developed. Streets have been designed to meet the minimum widths. Landscaping of the slopes and common areas is incorporated into the plans. The landscaping will consist of both native and nonnative plants. The goal is to achieve plant establishment expeditiously to reduce erosion. The irrigation system for these landscaped areas will be

monitored to reduce overirrigation. Also, riprap will be placed as storm drain outfalls to reduce velocities.

The design of the site will provide adequate BMPs to reduce the amount of pollutants introduced into storm runoff, as required by the County Clean Water Ordinances. These BMPs will include, but are not limited to, the following:

- The site design will maximize landscaping areas and minimize impervious surfaces to allow more infiltration of runoff water.
- The site will maximize the use of vegetation and will promote the use of drought-tolerant plants.
- Preserve much of the natural vegetation and swales in the southern portion of the site.

Source Control BMPs

Source control BMPs will consist of measures to prevent polluted runoff. This program will include an educational component directed at each homeowner. The homeowners will receive a set of brochures developed by the County's Environmental Health Department. These will include the following:

- Storm Water Runoff Pollution Fact Sheet;
- Storm Water Runoff Pollution Prevention Tips for Homeowners;
- Storm Water Pollution Prevention Yard Work (Landscaping, Gardening, Pest Control);
- Storm Water Pollution Prevention Pet Waste; and
- Storm Water BMP Swimming Pool and Spa Cleaning.

In addition, storm drain inlets will be stenciled with a message warning citizens not to dump pollutants into the drains.

Treatment Control BMPs

Construction plans will provide adequate treatment facilities to reduce the amount of pollutants introduced into storm runoff, as required by the County Clean Water Ordinances. These facilities will include, but are not limited to, the following:

- The project proposes installation of Flo-Gard "Downspout Filter Assemblies" for roof drains at the project. The Flo-Gard downspouts, or approved equivalent, will remove nonsoluble pollutants (such as sediment, gravel, hydrocarbons, etc.) that typically are found on building roofs. See Appendix A for the manufacturer's product information.

- Place Fossil Filter systems in curb inlets (Kristar's FLO-GARD system or similar), to reduce debris and pollutants entering the storm drain systems.
- Install Storm Water Treatment Units, prior to releasing flows into the natural channels (CDS Storm Water Treatment Unit or similar), to reduce pollutants introduced into the natural earthen channel.

The CDS Technology was developed as a gross pollutant trap and is a proprietary product manufactured under patents by CDS Technologies, Inc. The technology captures and retains floatables, trash, and debris greater than 0.05 inch in storm water runoff, as well as capturing fine sand and larger particles and the pollutants attached to those particles. The CDS unit is a nonmechanical self-operating system and will function when there is flow in the storm drainage system. The unit is designed to capture pollutants in flows up to the design capacity and during extreme rainfall events when the designed capacity may be exceeded. Material captured in the CDS unit's separation chamber and sump is retained even when the unit's design capacity is exceeded.

One important siting requirement is that sufficient head is available so that water stored in the device does not cause a backwater condition in the storm drain system, which would limit its capacity.

Note: See Appendix A for the fossil filter and CDS storm water treatment unit details.

- Include Riprap at downstream headwalls to reduce runoff velocities and decrease erosion.

SECTION 6 OPERATION AND MAINTENANCE STORM WATER MANAGEMENT PROGRAM

6.1 MAINTENANCE RESPONSIBILITY

The owner will be responsible for implementation and maintenance of all storm water management practices. SWPP Plans will indicate the maintenance responsibility of owners for any proposed postconstruction BMPs.

6.2 MAINTENANCE ACTIVITIES PER BMPs

The owner shall maintain and inspect the storm water treatment units and the fossil filters.

Kristar FloGard System and CDS Storm Water Treatment (or Similar)

Design Criteria, Routine Action

Volume design per the County's first flush of storm runoff or 85th percentile storm intensity.

Field Measurements

Only a visual inspection of the fossil filter is required to determine if maintenance is required.

The operational and maintenance needs of a CDS or fossil filter are:

- Inspection of its structural integrity and its screen for damage.
- Animal and vector control.
- Periodic sediment removal to optimize performance.
- Scheduled trash, debris, and sediment removal to prevent obstruction.
- Removal of graffiti.
- Preventive maintenance of BMP equipment and structures.
- Erosion and structural maintenance to maintain the performance of the CDS or fossil filter.

Inspection Frequency

The facility will be inspected and inspection visits will be completely documented:

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation).
- On a weekly basis during extended periods of wet weather.

Aesthetic and Functional Maintenance

Aesthetic maintenance is important for public acceptance of stormwater facilities. Functional maintenance is important for performance and safety reasons.

Both forms of maintenance will be combined into an overall Stormwater Management System Maintenance.

Aesthetic Maintenance. The following activities will be included in the aesthetic maintenance program:

- Graffiti Removal. Graffiti will be removed in a timely manner to improve the appearance of a CDS or fossil filter and to discourage additional graffiti or other acts of vandalism.

Functional Maintenance. Functional maintenance has two components: Preventive maintenance and corrective maintenance.

Preventive Maintenance. Preventive maintenance activities to be instituted at a CDS or fossil filter are:

- Trash and Debris Removal. Trash and debris accumulation, as part of the operation and maintenance program at a CDS or fossil filter, will be monitored once a month during the dry and wet seasons and after every large storm event. Trash and debris will be removed from the CDS or fossil filter unit annually (at end of the wet season), or when material is at 85% of CDS or fossil filter' sump capacity, or when the floating debris is 12 inches deep, whichever occurs first.
- Sediment Removal. Sediment accumulation, as part of the operation and maintenance program at a CDS or fossil filter, will be monitored once a month during the dry season, after every large storm (0.50 inch). Sediment will be removed from the CDS or fossil filter annually (at end of the wet season), or when material is at 85% of CDS or fossil filter' sump capacity, or when the floating debris is 12 inches deep, whichever occurs first. Characterization and disposal of sediment will comply with applicable local, county, state, or federal requirements.

- Mechanical and Electronic Components. Regularly scheduled maintenance will be performed on fences, gates, locks, and sampling and monitoring equipment in accordance with the manufacturers' recommendations. Electronic and mechanical components will be operated during each maintenance inspection to assure continued performance.
- Elimination of Mosquito Breeding Habitats. The most effective mosquito control program is one that eliminates potential breeding habitats.

Corrective Maintenance. Corrective maintenance is required on an emergency or nonroutine basis to correct problems and to restore the intended operation and safe function of a CDS or fossil filter. Corrective maintenance activities include:

- Removal of Debris and Sediment. Sediment, debris, and trash, which impede the hydraulic functioning of a CDS or fossil filter, will be removed and properly disposed. Temporary arrangements will be made for handling the sediments until a permanent arrangement is made.
- Structural Repairs. Once deemed necessary, repairs to structural components of a CDS or fossil filter and its inlet and outlet structures will be done within 30 working days. Qualified individuals (i.e., the manufacturer representatives) will conduct repairs where structural damage has occurred.
- Erosion Repair. Where factors have created erosive conditions (i.e., pedestrian traffic, concentrated flow, etc.), corrective steps will be taken to prevent loss of soil and any subsequent danger to the performance of a CDS or fossil filter. There are a number of corrective actions that can be taken. These include erosion control blankets, riprap, or reduced flow through the area. Designers or contractors will be consulted to address erosion problems if the solution is not evident.
- Fence Repair. Repair of fences will be done within 30 days to maintain the security of the site.
- Elimination of Animal Burrows. Animal burrows will be filled and steps taken to remove the animals if burrowing problems continue to occur (filling and compacting). If the problem persists, vector control specialists will be consulted regarding removal steps. This consulting is necessary, as the threat of rabies in some areas may necessitate the animals being destroyed rather than relocated. If the BMP performance is affected, abatement will begin. Otherwise, abatement will be performed annually in September.
- General Facility Maintenance. In addition to the above elements of corrective maintenance, general corrective maintenance will address the overall facility and its

associated components. If corrective maintenance is being done to one component, other components will be inspected to see if maintenance is needed.

Maintenance Activity

Report all maintenance activities to the proper agencies, as required by local ordinances.

Site-Specific Requirement

Will be provided in the next phase of the project, if any.

Note: Proper proof of maintenance will be reported to the appropriate agency.

BMP Cost Estimate for Catch Basin Inserts (Fossil Filter and CDS)

To treat "maximized storage volume calculated for detention basin in 24 hours, outflow = 13,400 cubic feet/24 hours = 69.6 gallons per minute (gpm).

Aquashield Model 300, capacity 855 gpm = \$1,335.

Fossil Filter 2' x 2' rectangular, capacity 76 gpm = \$1,000.

Warehouse Project = \$1,000.

Land Cost = Negligible.

Storm Drain Connection Cost = ~\$300.

Maintenance and Disposal Cost:

Three cleanings and two replacements = \$285/year.

SECTION 7

FISCAL RESOURCES AND REFERENCES

7.1 FISCAL RESOURCES

This section is intended to provide information regarding the ability of the owner/developer to ensure the construction and maintenance of postconstruction BMPs (Section G.7.2, Storm Water Standards Manual, Ordinance 9426).

Note: The County is developing categorical guidance for long-term BMP maintenance and resourcing. This guidance provides options and maintenance categories that can be used to complete this section. This guidance will be presented to the Board of Supervisors in June 2002, for approval. A draft of this guidance is available at www.scdcpw.org.

7.2 REFERENCES

- *Water Quality Control Plan for the San Diego Basin (9)*, California Regional Water Quality Control Board, adopted September 8, 1994.
- *San Diego County Hydrology Manual*, County of San Diego, September 2001.

SECTION 8 SUMMARY/CONCLUSIONS

This SWMP has been prepared in accordance with the Watershed Protection, Storm Water Management, and Discharge Control Ordinance and the Storm Water Standards Manual. This SWMP has evaluated and addressed the potential pollutants associated with this project and their effects on water quality. A summary of the facts and findings associated with this project and the measures addressed by this SWMP is as follows:

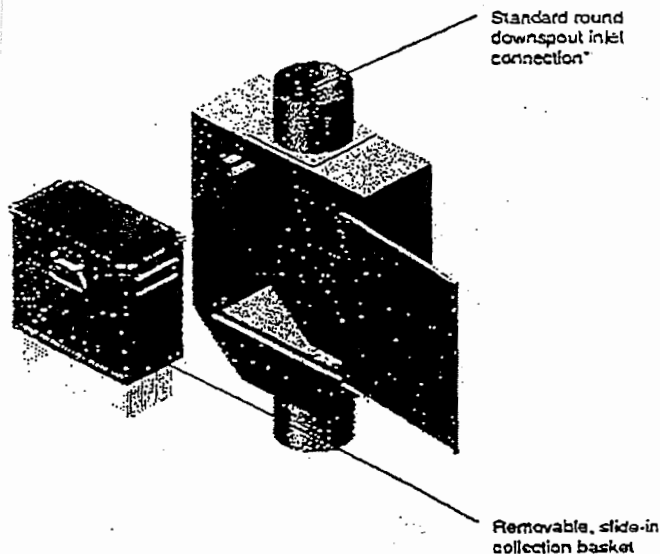
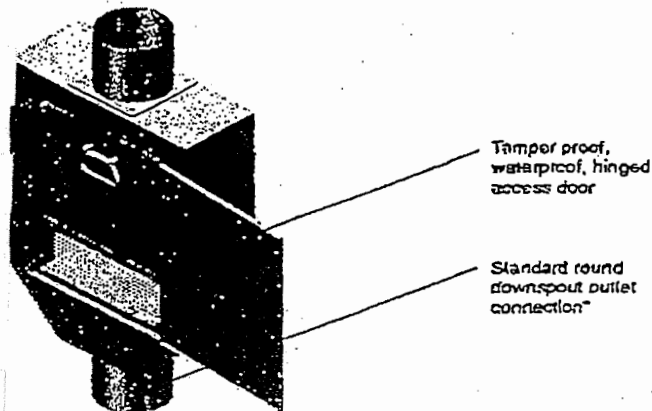
- The beneficial uses for the receiving waters have been identified. None of these beneficial uses will be impaired or diminished due to the construction and operation of this project.
- The Queen of Angels project will not significantly alter drainage patterns on the site. The discharge points will not be changed, and riprap energy dissipators will be placed to attenuate the flow velocities, thus preventing downstream erosion.
- An additional 40% of the total project area will be impervious. Open areas and slopes will be landscaped to reduce or eliminate sediment discharge.
- The proposed construction and postconstruction BMPs address mitigation measures to protect water quality, and protect water quality objectives and beneficial uses to the maximum extent practicable.

APPENDIX A PRODUCT INFORMATION

FloGard™

ARCHITECTURAL SERIES

DOWNSPOUT FILTER ASSEMBLY



FEATURES

- Handles non-soluble solids such as sediment, gravel, hydrocarbons
- Uses the same effective filter medium as the other FloGard filter products
- Custom size or shape downspout pipe connections available
- Easy, economical installation
- Easy, low cost maintenance

The FloGard™ Downspout Filter Assembly is typically installed on commercial or industrial building downspout (downrain) pipes for the removal of non-soluble pollutants normally found on building roofs (sediment, gravel, hydrocarbons, etc.).

Constructed of corrosion-resistant stainless steel (Type 304), the FloGard™ Downspout Filter is designed to accept either 4" or 6" diameter downspout pipes. Special size or shape downspout pipe connections are available upon request.

FloGard™ Downspout Filters offer a tamper-proof, water-proof, hinged access door and easy slide-in pollutant collection basket for ease of maintenance.

Specifications

Model No.

FG-DS6	Inlet Diameter	6" (Sch. 40)
	Outlet Diameter	6" (Sch. 40)
	Outside Dimensions	18" x 24" x 7"
FG-DS4	Inlet Diameter	4" (Sch. 40)
	Outlet Diameter	4" (Sch. 40)
	Outside Dimensions	18" x 24" x 5"

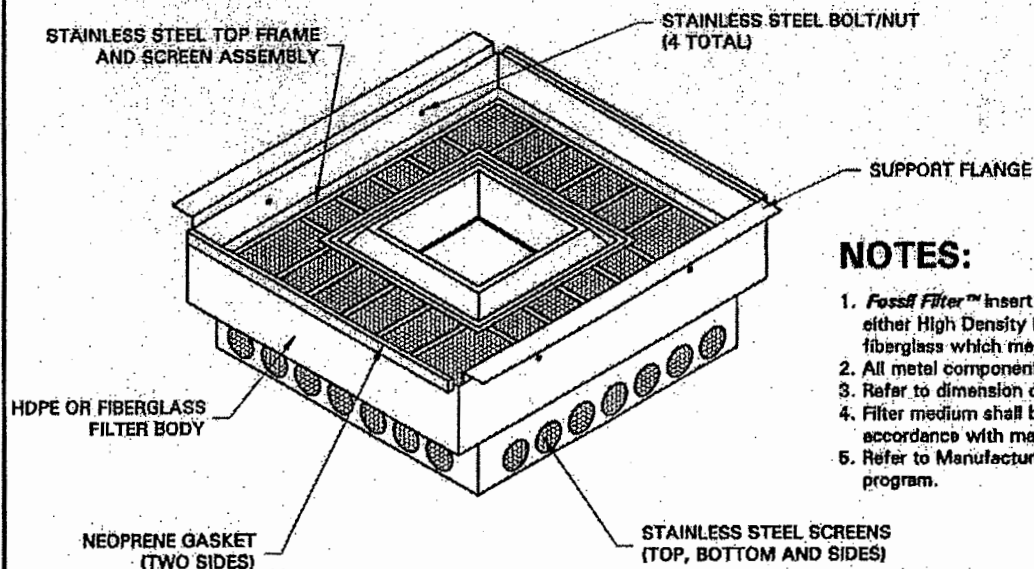
Clean Flow Rate	455 gpm (1.01 cfs)
Bypass Flow Area (%)	125% min.

* Non-standard shapes and dimensions available upon request



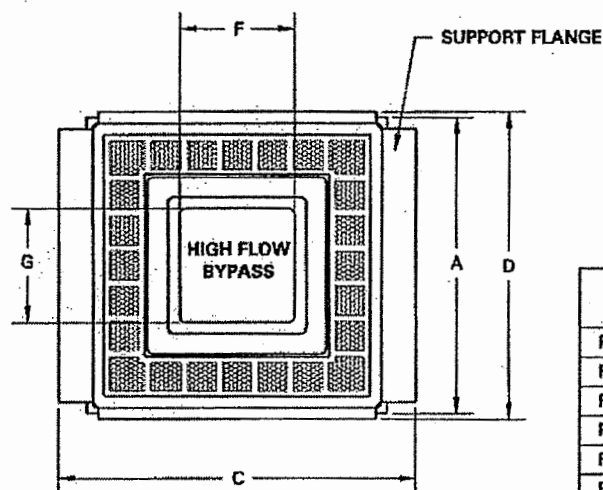
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 FloGard™ is a registered trademark of KriStar Enterprises, Inc.
 KriStar Enterprises, Inc. • P.O. Box 7352 • Santa Rosa, CA 95407-0352 • PH: 509-579-8819 • FAX: 707-524-8186 • www.kristar.com



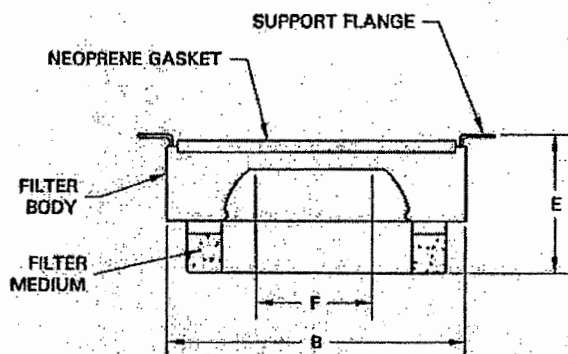


NOTES:

1. *Fossil Filter™* insert body shall be one piece manufactured from either High Density Polyethylene (HDPE) or petroleum resistant fiberglass which meets or exceeds PS 15-69.
2. All metal components shall be a stainless steel (Type 304).
3. Refer to dimension chart for catch basin and filter sizing.
4. Filter medium shall be *Fossil Rock™* installed and maintained in accordance with manufacturer recommendations.
5. Refer to Manufacturer's recommendations for maintenance program.



TOP VIEW



SECTION VIEW

DIMENSION CHART

MODEL NO.	A	B	C	D	E	F	G
FF-V64	13"	13"	15.5"	13.5"	6"	5"	5"
FF-1618	15"	15"	17.5"	15.5"	8.5"	6"	6"
FF-1818	17"	17"	19.5"	17.5"	8.5"	8"	8"
FF-1624	23"	15"	17.5"	23.5"	8.5"	6"	13"
FF-1824	23"	17"	19.5"	23.5"	8.5"	13"	8"
FF-2424	23"	23"	26"	23.5"	8.5"	13"	13"
FF-2430	29"	23"	26"	29.5"	8.5"	13"	19"
FF-2436	35"	23"	26"	35.5"	8.5"	13"	25"
FF-2438S	23"	36"	39"	23.5"	8.5"	25"	13"
FF-2448	47"	23"	26"	47.5"	8.5"	13"	38"
FF-3030	29"	29"	34"	29.5"	8.5"	19"	19"
FF-3636	35"	36"	39"	35.5"	8.5"	25"	25"
FF-3648	47"	35"	39"	47.5"	8.5"	25"	37"
FF-4848	47"	47"	53"	47.5"	8.5"	37"	37"

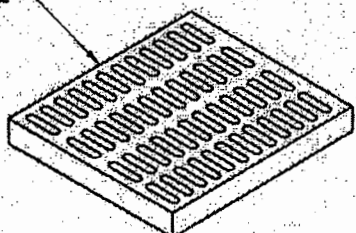
FOSSIL FILTER™ HYDROCARBON FILTER INSERT

(SHEET 1 OF 5)

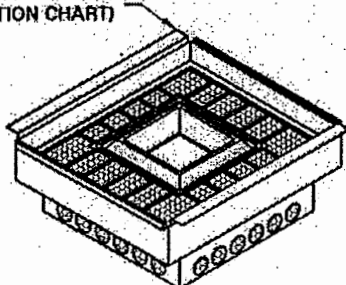
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U.S. PATENT NO. 5,720,574

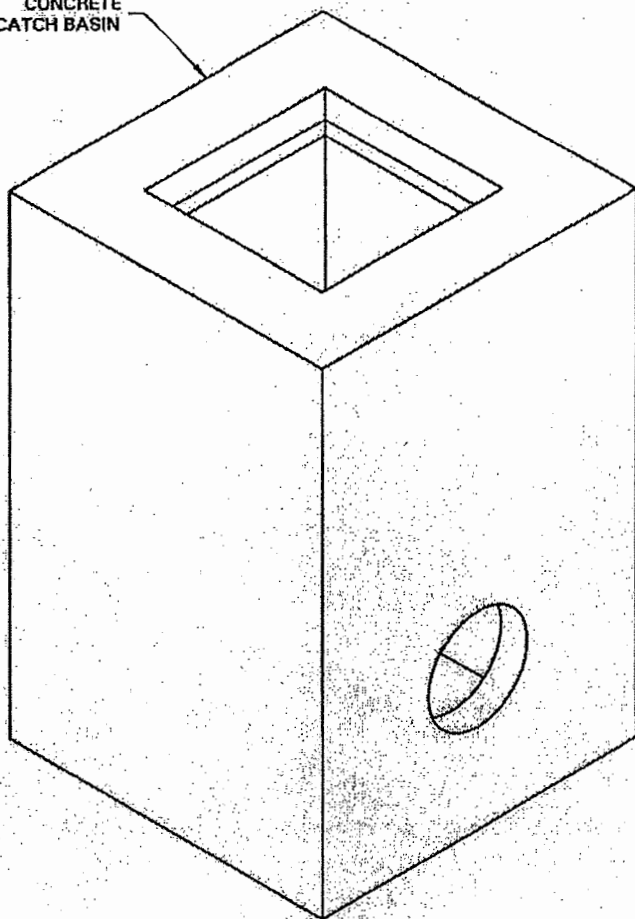
INLET GRATE



FOSSIL FILTER™ INSERT
(SEE APPLICATION CHART)



CONCRETE
CATCH BASIN



NOTES:

1. *Fossil Filter*™ insert body shall be one piece manufactured from either High Density Polyethylene (HDPE) or petroleum resistant fiberglass which meets or exceeds PS 15-59.
2. All metal components shall be a stainless steel (Type 304).
3. Refer to dimension chart for catch basin and filter sizing.
4. Filter medium shall be *Fossil Rock*™ installed and maintained in accordance with manufacturer recommendations.
5. Refer to Manufacturer's recommendations for maintenance program.

APPLICATION CHART

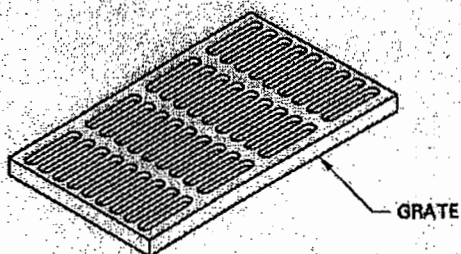
MODEL NO.	Filter O.D.	Inlet I.D.
FF-V64	13.00" x 13.00"	14.00" x 14.00"
FF-1616	15.00" x 15.00"	16.00" x 16.00"
FF-1818	17.00" x 17.00"	18.00" x 18.00"
FF-1624	15.00" x 23.00"	16.00" x 24.00"
FF-1824	17.00" x 23.00"	18.00" x 24.00"
FF-2424	23.00" x 23.00"	24.00" x 24.00"
FF-2430	23.00" x 29.00"	24.00" x 30.00"
FF-2436	23.00" x 35.00"	24.00" x 36.00"
FF-2448	23.00" x 47.00"	24.00" x 48.00"
FF-3030	29.00" x 29.00"	30.00" x 30.00"
FF-3636	35.00" x 35.00"	36.00" x 36.00"
FF-3648	35.00" x 47.00"	36.00" x 48.00"
FF-4848	47.00" x 47.00"	48.00" x 48.00"

FOSSIL FILTER™ HYDROCARBON FILTER INSERT INSTALLATION DETAIL

(SHEET 2 OF 5)

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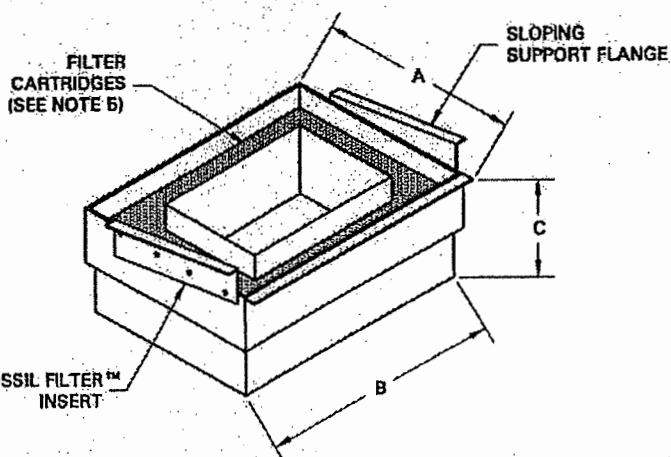
U.S. PATENT NO. 5,720,574



GRATE

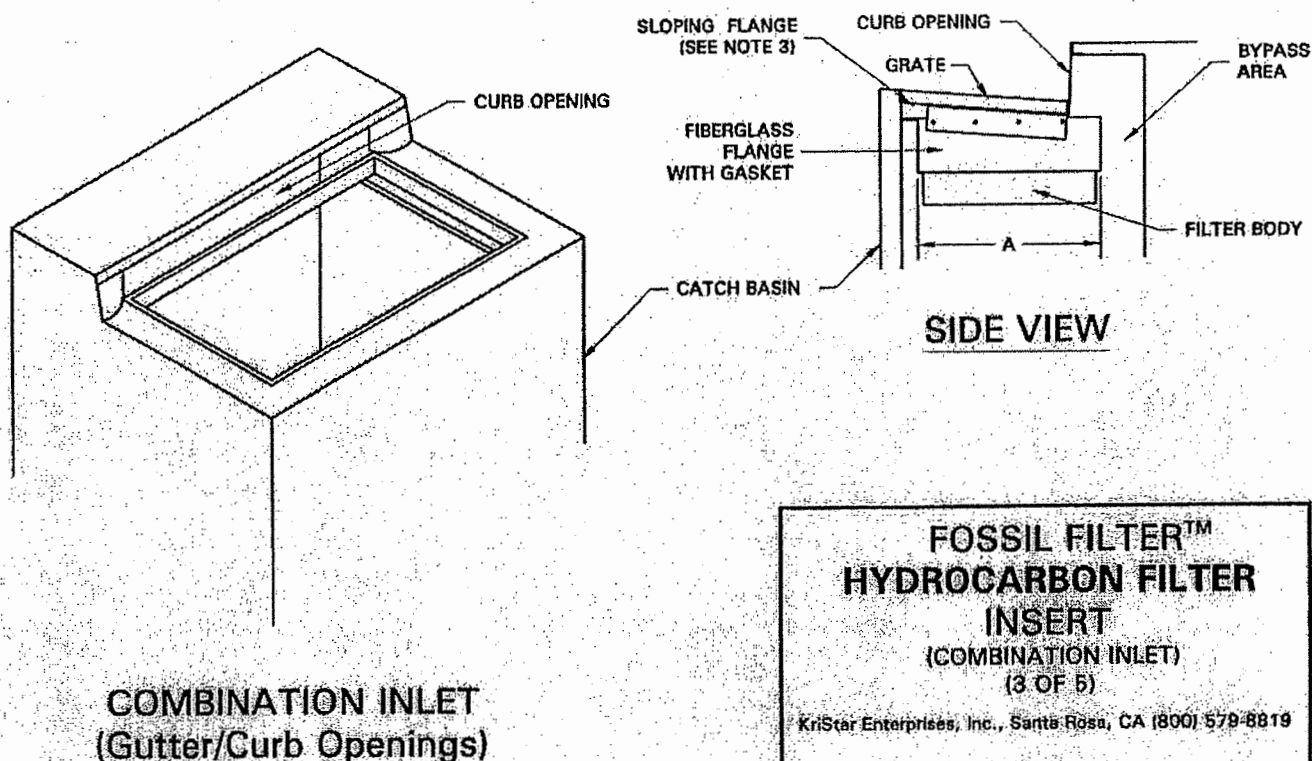
NOTES:

1. *Fossil Filter™* Insert body shall be one piece, manufactured from petroleum resistant fiberglass which meets or exceeds PS 15-69 or HDPE plastic.
2. All metal components shall be stainless steel (Type 304).
3. Support flange shall be sloped allowing for installed filter body to set on level plane.
4. Refer to dimension chart for grate and filter sizing.
5. *Fossil Filter™* shall have removable filter cartridges (quantity of 4) for ease of maintenance.
6. Filter medium shall be *Fossil Rock™* installed and maintained in accordance with manufacturer recommendations.
7. Refer to Manufacturer's recommendations for maintenance program.
8. Catch basin grate dimensions are approximate. Custom size filters are available upon request.



DIMENSION CHART

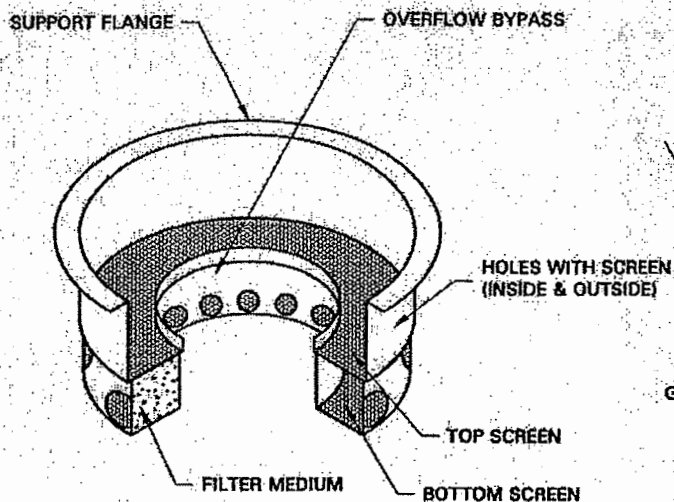
MODEL NO.	A	B	C	Grate Dimension
FF-1824FGO	17"	23"	8"	18" X 26"
FF-1836FGO	17"	34"	8"	18" X 40"
FF-2436FGO	23"	34"	8"	24" X 40"



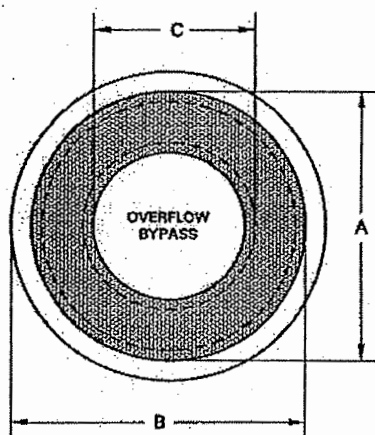
FOSSIL FILTER™ HYDROCARBON FILTER INSERT (COMBINATION INLET) (3 OF 5)

KriStar Enterprises, Inc., Santa Rosa, CA (800) 579-8819

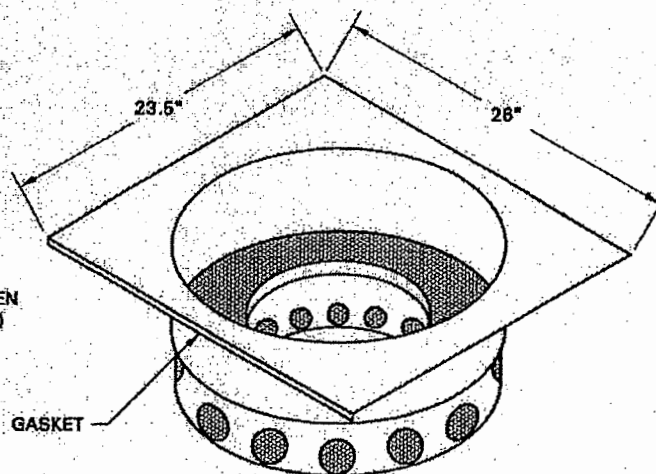
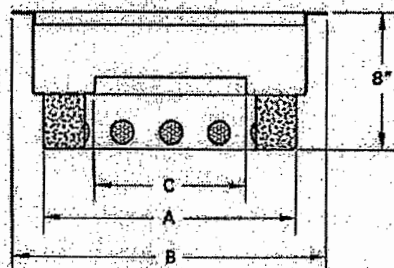
U.S. PATENT NO. 5,720,574



TOP VIEW



SECTION VIEW



MODEL RF-24H-S
(CIRCULAR FILTER WITH SQUARE FLANGE)

NOTES:

1. Filter body shall be one-piece manufactured from High Density Polyethylene Plastic (HDPE) or petroleum-resistant fiberglass which meets or exceeds PS 15-69.
2. All metal components shall be stainless steel (Type 304).
3. Model RF-24H filter is available with square top flange to fit square or square-to-round drop inlets. (Specify Model RF-24HS)
4. Filter medium shall be *Fossil Rock*™ installed and maintained in accordance with manufacturer recommendations.
5. Refer to application chart for catch basin and filter sizing.

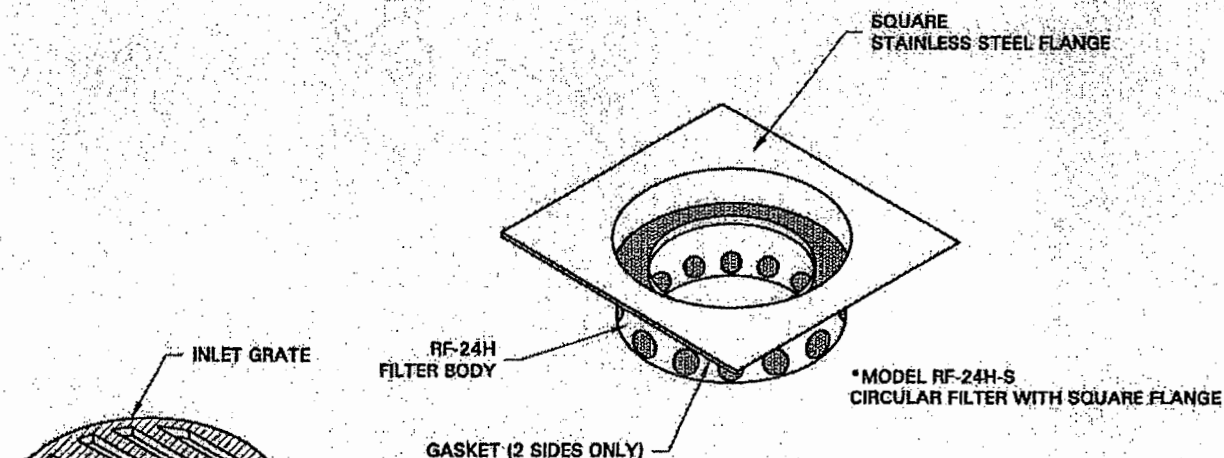
DIMENSION CHART

MODEL NO.	A	B	C
RF-15F	15"	17"	9"
RF-18F	17"	19"	9"
RF-20MF	20"	23"	11"
RF-24H	23"	26"	13"
RF-24H-S	23"	23.6"x26"	13"

NOTE: Top Flanges that enable this product to be installed in larger and/or nonstandard drainage inlets are available.

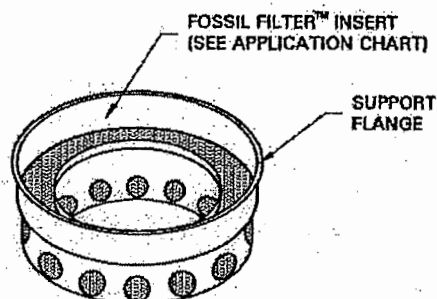
FOSSIL FILTER™
HYDROCARBON FILTER
(CIRCULAR)
INSERT
(SHEET 4 OF 6)

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U.S. PATENT NO. 5,720,574



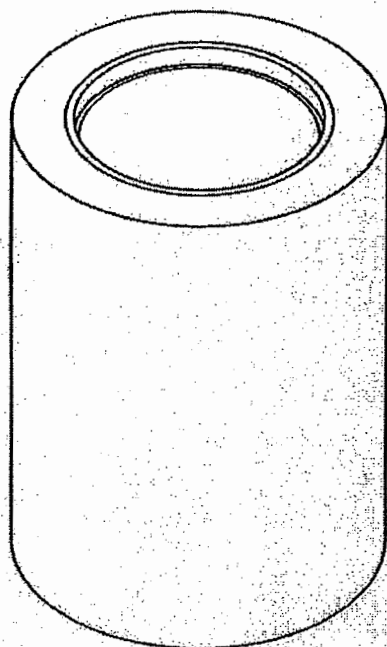
NOTES:

1. *Fossil Filter™* Insert body shall be one piece manufactured from either High Density Polyethylene (HDPE) or petroleum resistant fiberglass which meets or exceeds PS 15-69.
2. All metal components shall be a stainless steel (Type 304).
3. Refer to application chart for catch basin and filter sizing.
4. Model RF-24H-S Circular Filter is available with square top flange to fit square (24"x24") or square-to-round (24") drop inlet. Other sizes are available by special order.
5. Filter medium shall be *Fossil Rock™* installed and maintained in accordance with manufacturer recommendations.
6. Refer to Manufacturer's recommendations for maintenance program.



APPLICATION CHART

MODEL NO.	Filter O.D.	Inlet I.D.	GRATE O.D.
RF-24H	23.00"	24.00"	25.00"
RF-24H-S	23.00"	24.00"	26"X26"
RF-20MF	20.00"	21.00"	24.00"
RF-18F	17.00"	18.00"	19.00"
RF-15F	15.00"	16.00"	18.00"



PRECAST CONCRETE
DROP INLET

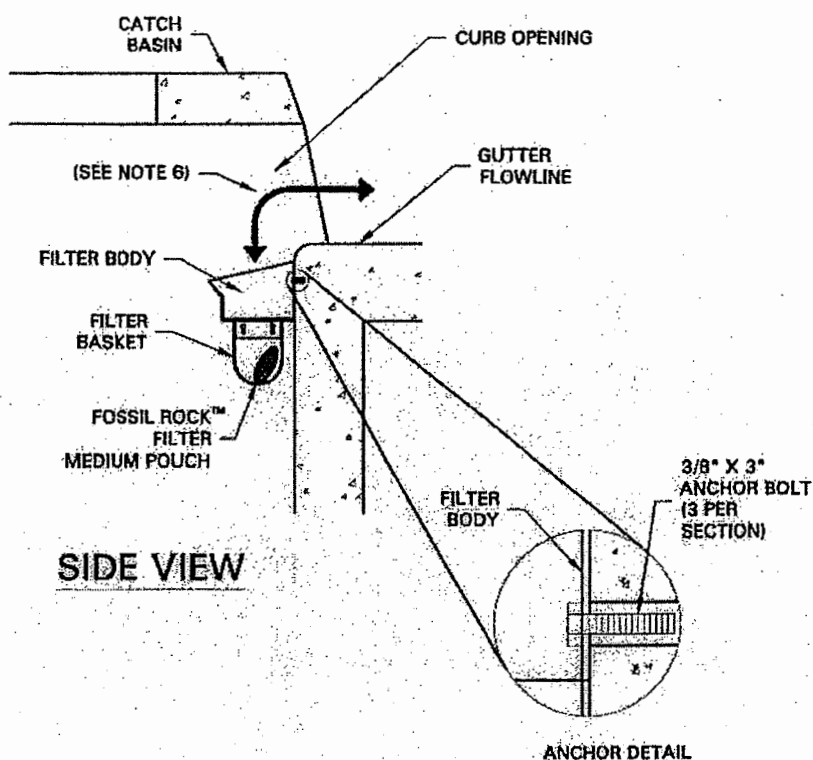
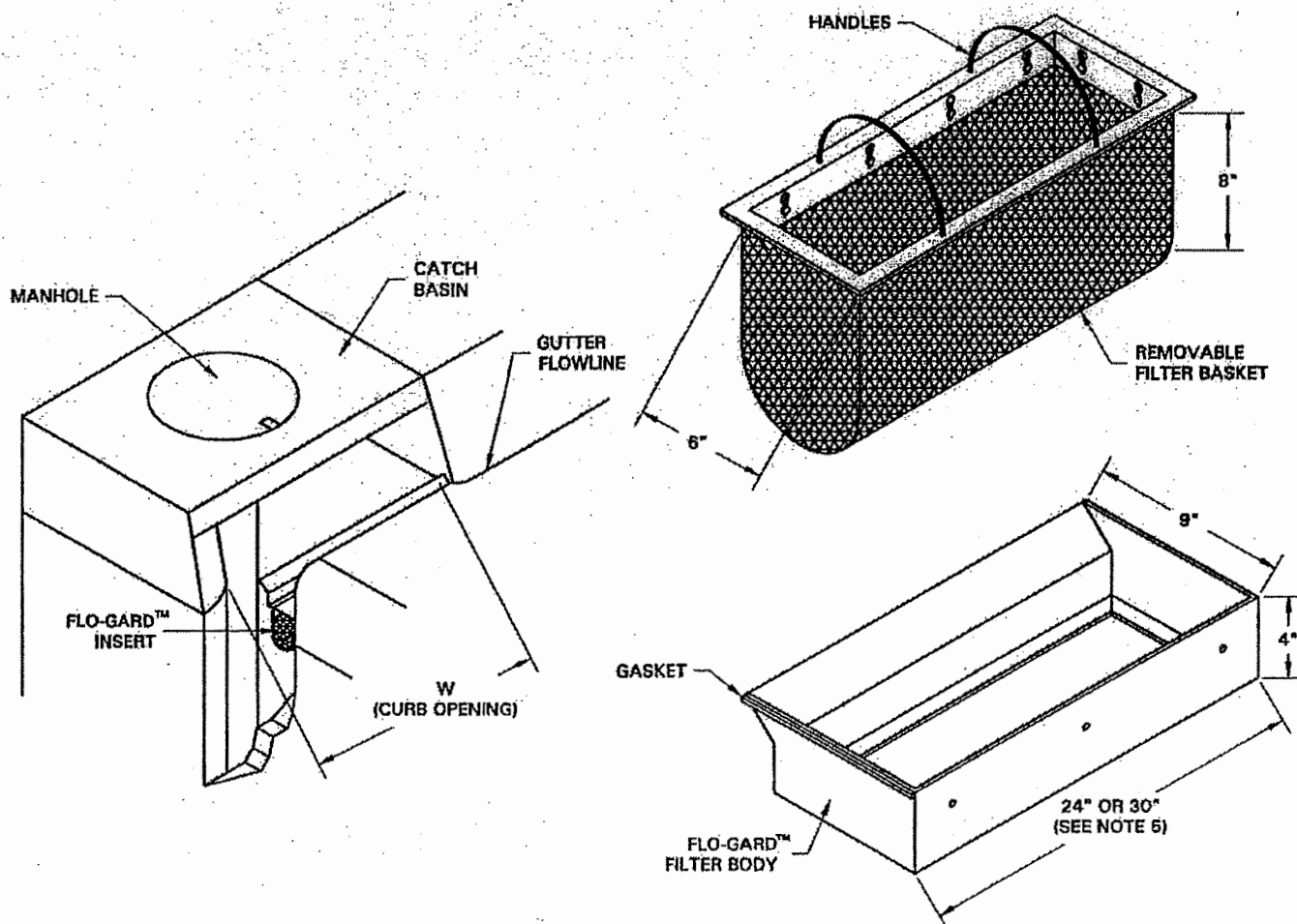
(*SEE NOTE 4)

FOSSIL FILTER™ HYDROCARBON FILTER INSERT (CIRCULAR) INSTALLATION DETAIL

(SHEET 5 OF 6)

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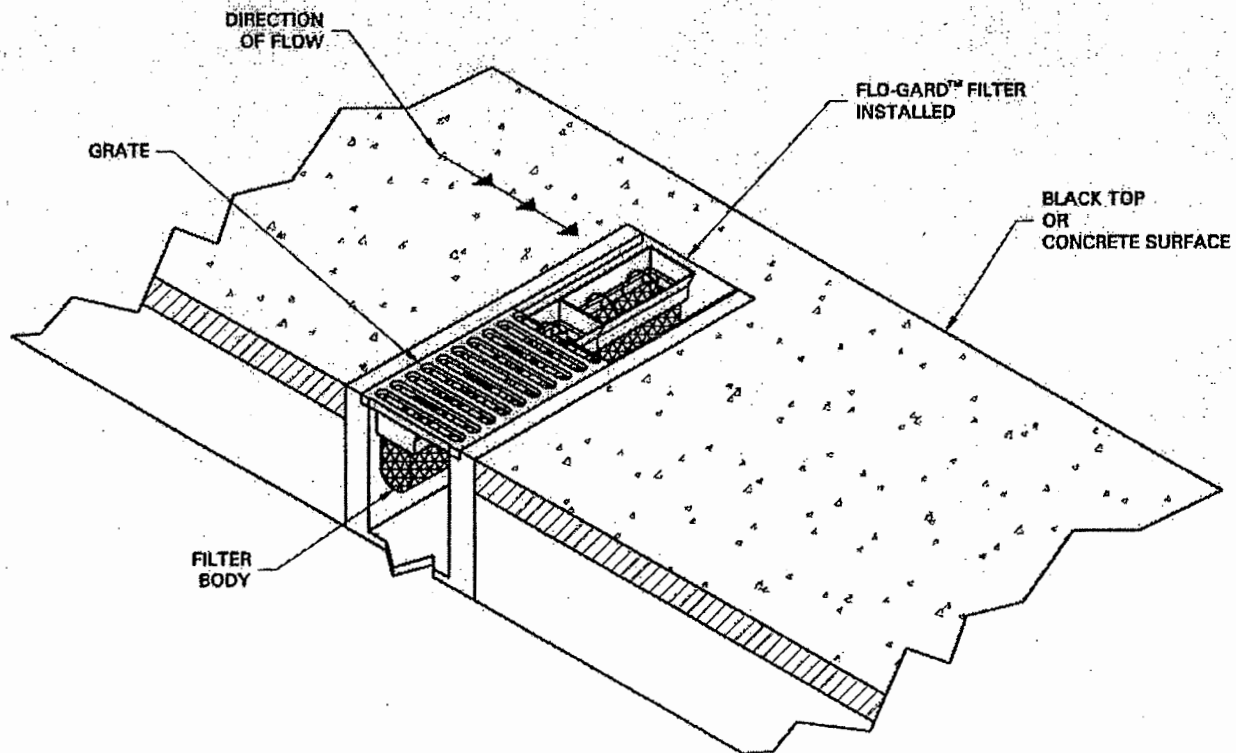


NOTES:

1. "Flo-Gard" filter body shall be manufactured from petroleum resistant fiberglass which meets or exceeds PS 15-69.
2. All metal components shall be stainless steel (Type 304).
3. Removable filter basket shall be constructed from durable polypropylene woven monofilament geotextile.
4. "Flo-Gard" filter body shall be secured to catch basin wall with expansion anchor bolts and washer. (See detail)
5. "Flo-Gard" Inserts are available in 24" or 30" length sections and may be installed in various combinations (end-to-end) to fit most catch basin widths.
6. Filter basket may be removed through curb opening for ease of maintenance.
7. Filter medium shall be *Fossil Rock*™ in disposable pouches, installed and maintained in accordance with manufacturer recommendations.

**FOSSIL FILTER™
FLO-GARD™
SUPPLEMENTAL INSERT
(CURB OPENING INLET)
(1 OF 2)**

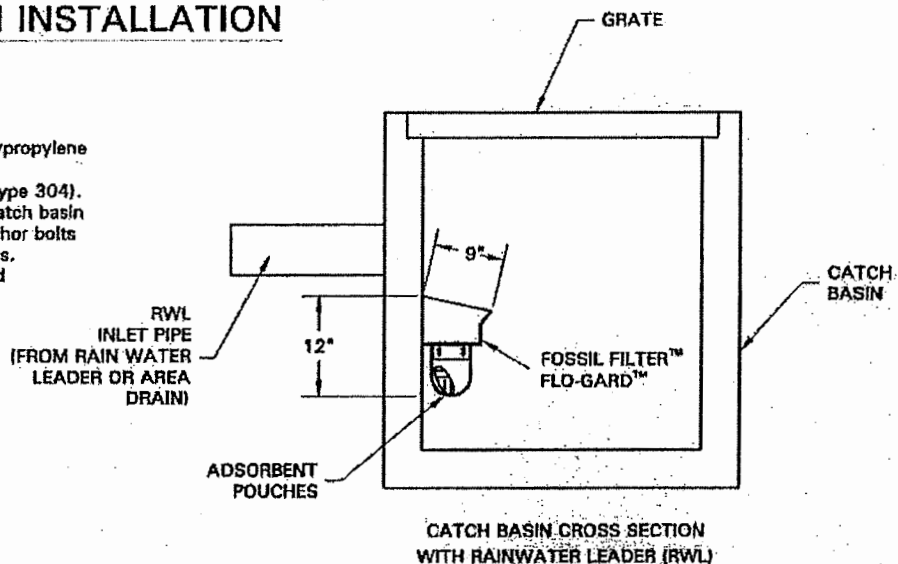
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PATENT PENDING



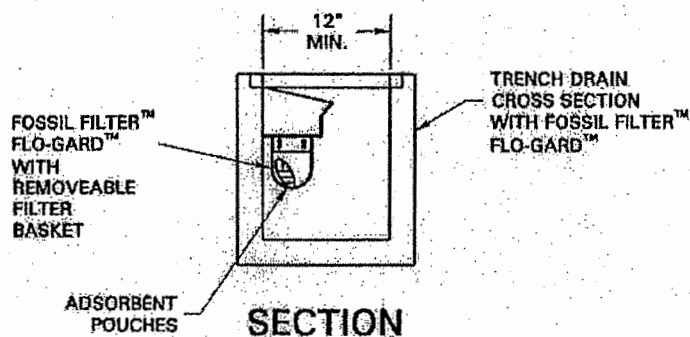
TYPICAL TRENCH DRAIN INSTALLATION

NOTES:

1. *Flo-Gard*™ Filter body is prefabricated from polypropylene woven monofilament geotextile.
2. All metal components shall be stainless steel (Type 304).
3. Filter body shall be secured to trench drain or catch basin wall with a minimum of three (3) expansion anchor bolts (1/2" x 3") and stainless steel bolts and washers.
4. Filter medium shall be *Fossil Rock*™ installed and maintained in accordance with manufacturer recommendations.



SIDE VIEW

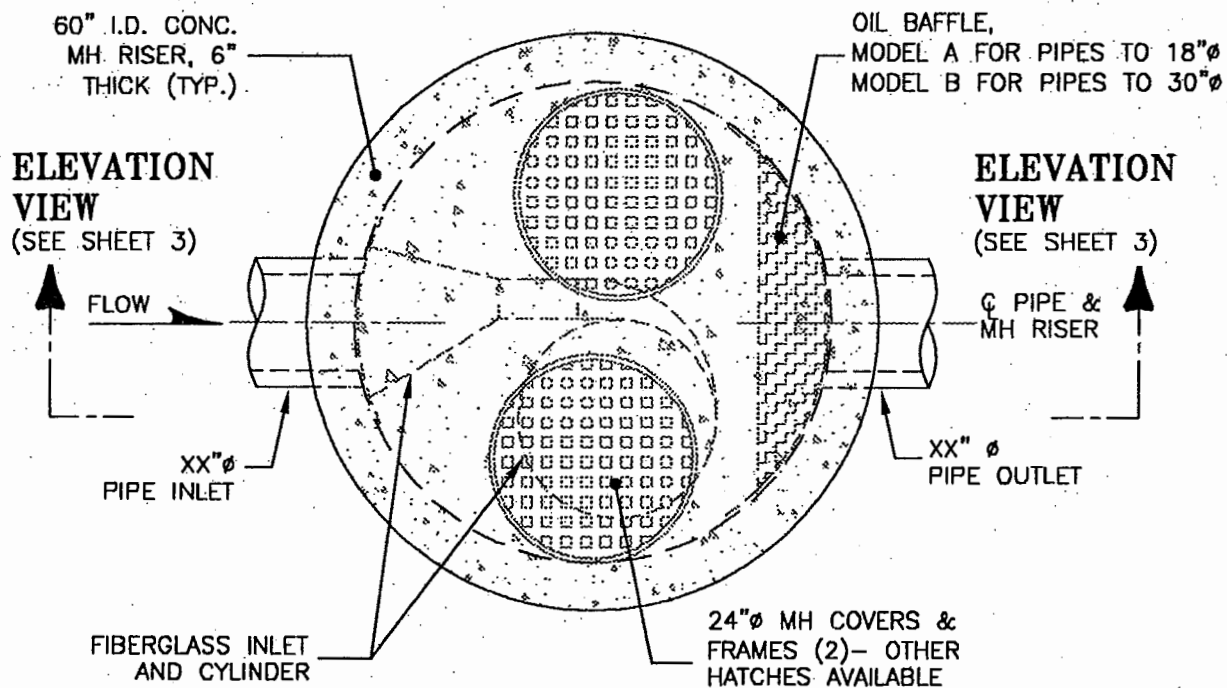


**FOSSIL FILTER™
FLO-GARD™
SUPPLEMENTAL INSERT
(TRENCH DRAIN)
(2 OF 2)**

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PATENT PENDING

TYPICAL / GENERIC INSTALLATION



NOTE:

THE INTERNAL COMPONENTS ARE SHOWN IN THE RIGHT-HAND CONFIGURATION-THese COMPONENTS MAY BE FURNISHED IN THE MIRROR IMAGE TO THAT SHOWN (LEFT-HAND CONFIGURATION)

CDS MODEL PMSU20_20, 1.1 CFS CAPACITY STORM WATER TREATMENT UNIT



PROJECT NAME
CITY, STATE

DATE 12/3/01

DRAWN J.S.F.

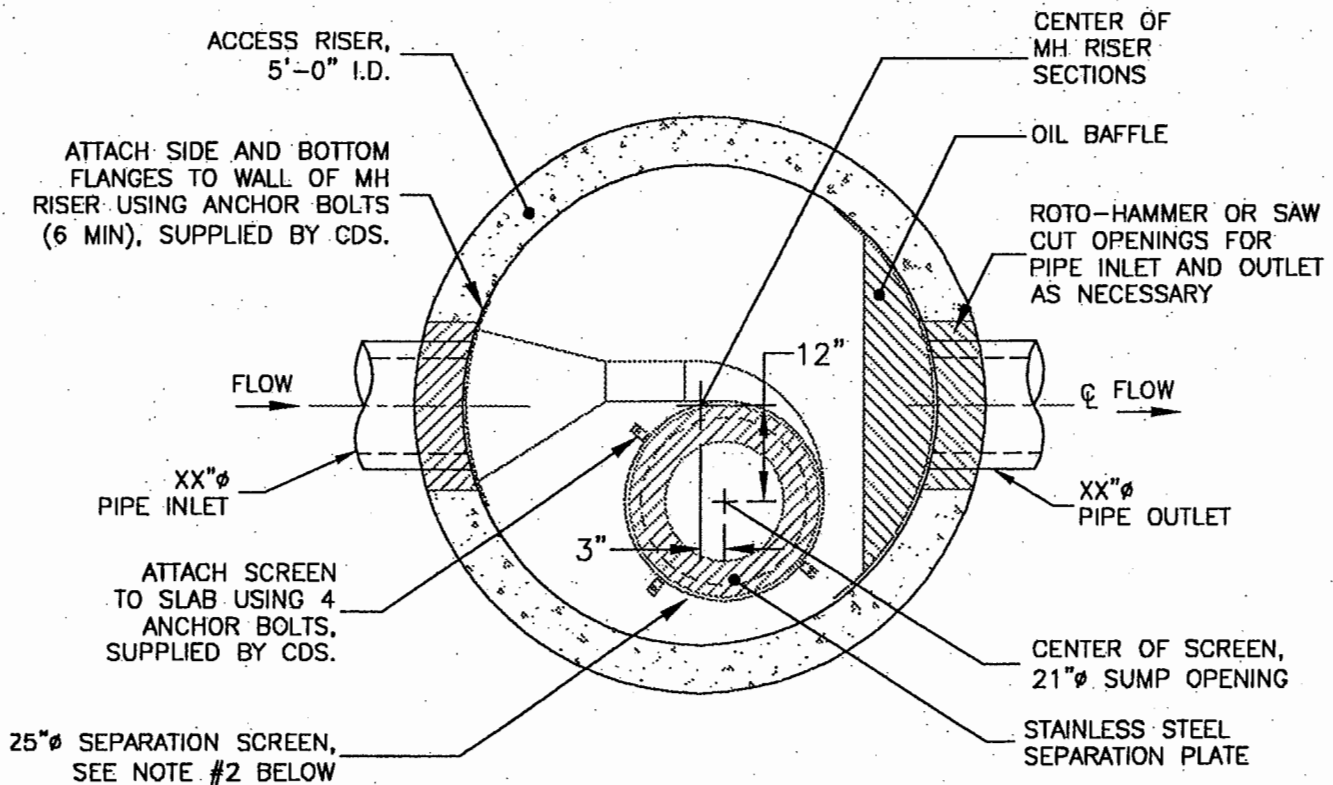
APPROV. R. HOWARD

SCALE
1"=2'

SHEET

2

TYPICAL / GENERIC INSTALLATION



NOTES:

1. THE INTERNAL COMPONENTS ARE SHOWN IN THE RIGHT-HAND CONFIGURATION—THESE COMPONENTS MAY BE FURNISHED IN THE MIRROR IMAGE TO THAT SHOWN (LEFT-HAND CONFIGURATION).
2. FOR PROPER INSTALLATION, GREEN FLANGE ON SCREEN FACES UP FOR RIGHT-HAND INSTALLATION, RED FLANGE FACES UP FOR LEFT-HAND ORIENTED UNITS.

**CDS MODEL PMSU20_20, 1.1 CFS CAPACITY
STORM WATER TREATMENT UNIT**



**PROJECT NAME
CITY, STATE**

DATE 12/3/01

DRAWN J.S.F.

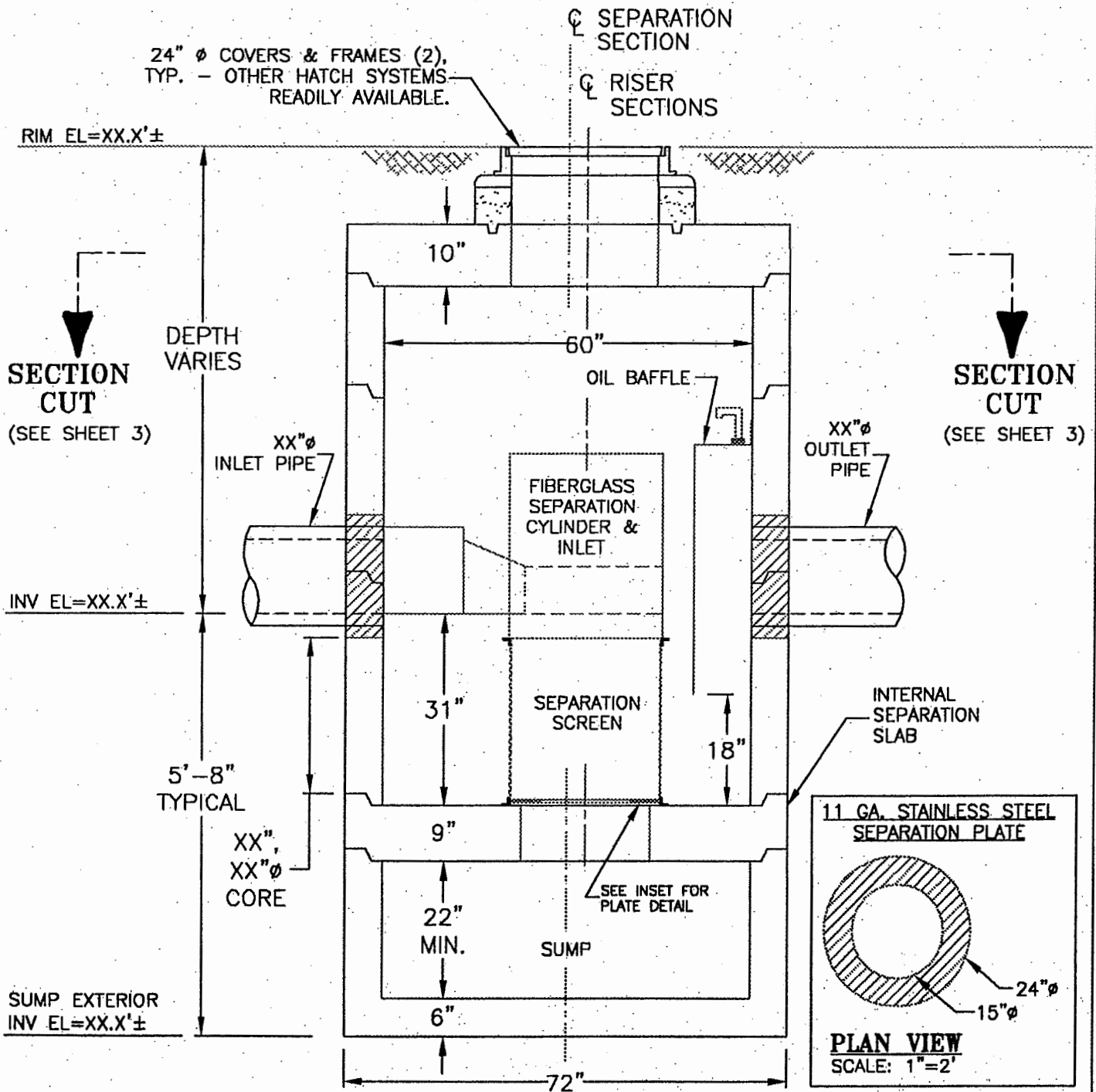
APPROV. R. HOWARD

SCALE
1"=2'

SHEET

3

TYPICAL / GENERIC INSTALLATION



CDS MODEL PMSU20_20, 1.1 CFS CAPACITY STORM WATER TREATMENT UNIT



PROJECT NAME
CITY, STATE

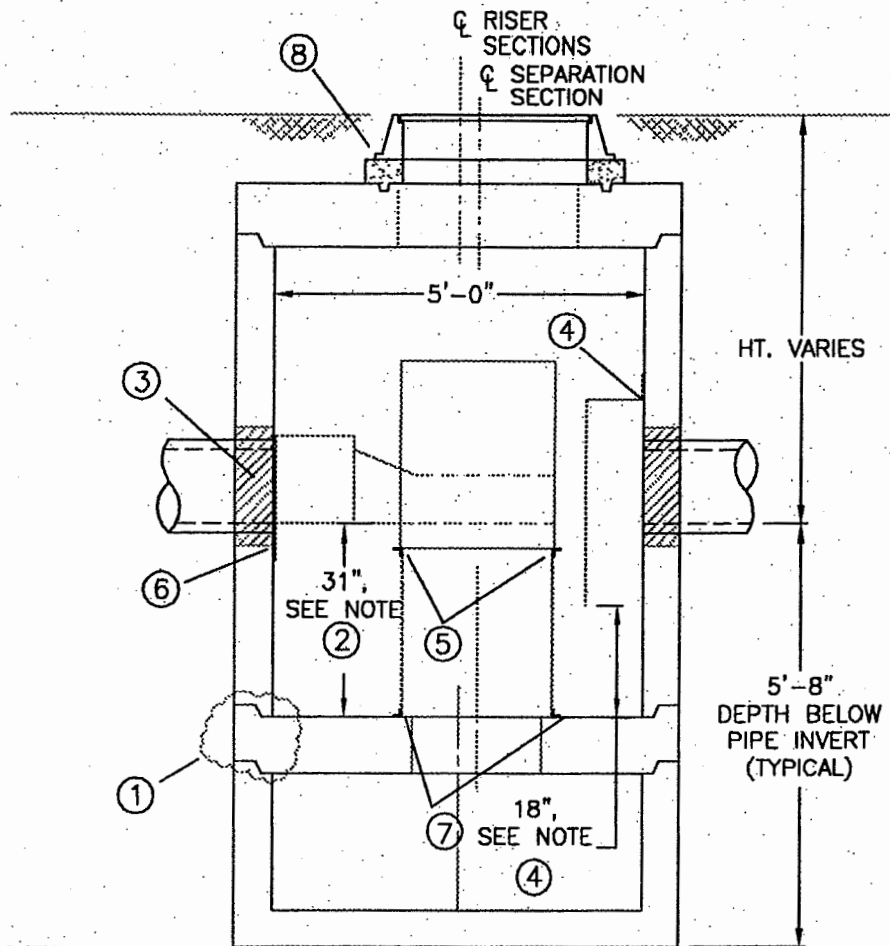
DATE
12/3/01

DRAWN
J.S.F.

APPROV.
R. HOWARD

SCALE
1"=2'

SHEET
4



CONSTRUCTION NOTES:

1. APPLY BUTYL MASTIC AND/OR GROUT TO SEAL JOINTS OF MANHOLE STRUCTURE. APPLY LOAD TO MASTIC SEAL IN JOINTS OF MH SECTIONS TO COMPRESS SEALANT IF NECESSARY. UNIT MUST BE WATER TIGHT, HOLDING WATER UP TO FLOWLINE INVERT (MINIMUM).
2. IF SEPARATION SLAB IS NON-INTEGRAL TO THE SEPARATION SECTION OF THE UNIT, SET AND VERIFY TOP ELEVATION BEFORE PLACING MORE PRECAST COMPONENTS OR BACKFILLING. ENSURE 31" FROM TOP OF SEPARATION SLAB TO PIPE INVERT.
3. ROTO-HAMMER OR SAW-CUT OPENINGS FOR PIPE INLET AND OUTLET AS NECESSARY; GROUT PIPE CONNECTIONS TO SEAL JOINT.
4. SET BOTTOM OF OIL BAFFLE 18" ABOVE SEPARATION SLAB FLOOR; DRILL AND INSERT A MINIMUM OF TEN (10) $3/8" \times 3 3/4"$ SS EXPANSION BOLTS @ 12" O.C. EQUALLY SPACED TO SECURE FIBERGLASS OIL BAFFLE FLANGE TO RISER WALL--(HARDWARE SUPPLIED BY CDS TECHNOLOGIES).
5. FASTEN FIBERGLASS CYLINDER/INLET TO SCREEN ASSEMBLY USING FOUR (4) SETS OF $1/2" \times 1 1/2"$ SS HEX HEAD BOLTS W/ NUTS AND WASHERS--(HARDWARE SUPPLIED BY CDS TECHNOLOGIES). IN THE LEFT-HANDED CONFIGURATION THE "RED" COLORED FLANGE ON THE SCREEN CYLINDER SHALL FACE UP. IN THE RIGHT-HANDED CONFIGURATION, THE "GREEN" COLORED FLANGE SHALL FACE UP.
6. CENTER SCREEN ASSEMBLY OVER SUMP OPENING AND POSITION FIBERGLASS INLET AGAINST RISER WALL; DRILL AND INSERT A MINIMUM OF SIX (6) $3/8" \times 3 3/4"$ SS EXPANSION BOLTS EQUALLY SPACED TO SECURE FIBERGLASS INLET FLANGE TO RISER WALL--(HARDWARE SUPPLIED BY CDS TECHNOLOGIES).
7. VERIFY THAT SCREEN ASSEMBLY IS CENTERED OVER SUMP ACCESS HOLE AND ADJUST IF NECESSARY; FASTEN SCREEN TO SEPARATION SLAB USING FOUR (4) $3/8" \times 3 3/4"$ SS EXPANSION BOLTS--(HARDWARE SUPPLIED BY CDS TECHNOLOGIES).
8. BLOCK AND GROUT SEAL TO MATCH GRADE AS REQUIRED.



PROJECT NAME
CITY, STATE

DATE
12/3/01

DRAWN
J.S.F.

APPROV.
R. HOWARD

SCALE
N.T.S.
SHEET

5

BMP EXHIBITS